Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) ~~The~~ A method for calculating charged rate of a secondary battery which is adapted to supply ~~supplies~~ electric power to ~~loads~~ a load, comprising the steps of:

providing a time function for the open circuit voltage of the secondary battery as a function of time with its coefficients undetermined;

measuring ~~voltages~~ voltage samples of the open circuit voltage of the secondary battery at a plurality of different time points within a predetermined period of time after termination of charge or discharge to obtain ~~a~~ plural measured ~~voltages~~ voltage samples along time axis;

~~sequentially calculating~~ using the plural measured ~~voltages~~ voltage samples to determine the coefficients of ~~a quadric or more exponential damping function which approximates time characteristic of an open circuit voltage of the secondary battery~~ the time function to thereby determine the time function;

calculating a convergent value of the open circuit voltage of the secondary battery based on ~~at least the coefficients determined~~ the determined time function; and

calculating the charged rate based on the convergent value of the open circuit voltage;

wherein the step of providing the time function comprises providing a combination of at least two exponential decay functions in which the combination of N exponential decay functions, hereinafter referred to as multi-exponential decay function, where N is an integer of at least two is given by

$$Y = a1\exp(-b1\cdot X) + a2\exp(-b2\cdot X) + a3\exp(-b3\cdot X) + a4\exp(-b4\cdot X) + \cdots + an\exp(-bn\cdot X) + c$$

wherein (2N+1) coefficients a1 to an, b1 to bn and c are undetermined, Y denotes the open circuit voltage, and X denotes time; and

wherein the step of using the plural measured voltage samples comprises using the measured voltage samples to determine the (2N+1) coefficients to determine the multi-exponential decay function.

2. (Currently amended) The method for calculating the charged rate as claimed in claim 1, wherein predetermined exponential decay terms included in the ~~quadric or more exponential damping~~ multi-exponential decay function are removed in correspondence to a standby time of measuring the plural measured ~~voltages~~ voltage samples along the time axis to calculate the convergent value of the open circuit voltage of the secondary battery.

3. (Currently amended) The method for calculating the charged rate as claimed in claim 1, wherein the ~~exponential damping~~ multi-exponential decay function is the function with time T as described below in the formula (1) which has five coefficients of A1, A2, A5, A6 and C:

$$F(T) = A1 \exp(A5 \cdot T) + A2 \exp(A6 \cdot T) + C \qquad (1)$$

wherein F(T) denotes the open circuit voltage.

4. (Currently amended) The method for calculating the charged rate as claimed in claim 1, wherein the ~~exponential damping~~ multi-exponential decay function is the function with time T as described below in the formula (2) which has nine coefficients of A1 to A9:

$$F(T) = A1 \exp(A5 \cdot T) + A2 \exp(A6 \cdot T) + A3 \exp(A7 \cdot T) + A4 \exp(A8 \cdot T) + A9 \qquad (2).$$

5. (Currently amended) The method for calculating the charged rate as claimed in claim ~~3~~ 4, wherein the formula (3) mentioned below is used in place of the function F(T) of the formula (2) when the standby time of voltage measurement is more than or equal to ~~the~~ a predetermined first time and less than a predetermined second time, the formula (4) mentioned below is used in place of the function F(T) of the formula (2) when the standby time of voltage measurement is more than or equal to the predetermined second time and less than a predetermined third time, and the formula (5) mentioned below is used in place of the function F(T) of the formula (2) when the standby time of voltage measurement is more than or equal to the predetermined third time:

$$F(T) = A2 \exp(A6 \cdot T) + A3 \exp(A7 \cdot T) + A4 \exp(A8 \cdot T) + A9 \quad (3)$$

$$F(T) = A3 \exp(A7 \cdot T) + A4 \exp(A8 \cdot T) + A9 \quad (4)$$

$$F(T) = A4 \exp(A8 \cdot T) + A9 \quad (5).$$

6. (Original) The method for calculating the charged rate as claimed in claim 1, wherein the charged rate of at least one of two or more secondary batteries is calculated.

7. (Original) The method for calculating the charged rate as claimed in claim 1, wherein the charged rates of at least two secondary batteries are calculated; and a display function which displays the charged rates of the secondary batteries and/or the determination of charge or replacement on each of the secondary batteries, or determination of ongoing use or not on the same, a storage function which records history of an individual battery, and a control and judgment function with a program to record the history of the determination and/or to determine repeatedly are included.

8. (Currently amended) An apparatus of calculating charged rate of a secondary battery~~,~~ which ~~calculates the charged rate of the secondary battery~~ is adapted to supply ~~at least~~ a load with electrical power, comprising:

a voltage sensor to measure voltage samples indicative of an open circuit voltage of the secondary battery at a plurality of different time points within a predetermined period of time after termination of charging or discharging;

a control ~~part~~ unit to ~~execute and control the computing process for calculation of~~ receive the measured voltage samples from the voltage sensor to calculate the charged rate; ~~and~~

~~a storage part to store the voltage value output from the voltage sensor and the datum required for the computing process on the control part;~~

~~wherein the control part receives the output from the voltage sensor once or more within a predetermined period of time after termination of charge or discharge, stores the more than one voltage measurement value into the storage part, recursively calculates with the more than one~~

~~voltage measurement value to be read from the storage part, determines the coefficients of a quadric or more exponential damping function to approximate the time characteristic of the open circuit voltage of the secondary battery, calculates a convergent value of the open circuit voltage based on the determined coefficients, and executes to calculating the charged rate from the convergent value~~ wherein the control unit comprises:

a providing means for providing a combination of at least two exponential decay functions in which the combination of N exponential decay functions, hereinafter referred to as multi-exponential decay function, where N is an integer of at least two is given by

$$Y = a1\exp(-b1\cdot X) + a2\exp(-b2\cdot X) + a3\exp(-b3\cdot X) + a4\exp(-b4\cdot X) + \cdots + an\exp(-bn\cdot X) + c$$

wherein (2N+1) coefficients a1 to an, b1 to bn and c are undetermined, Y denotes the open circuit voltage, and X denotes time;

a function determining means for using the measured voltage samples to determine the coefficients of the multi-exponential decay function to thereby determine the multi-exponential decay function; and

a charge determining means for calculating the charged rate of the secondary battery using at least the determined multi-exponential decay function, the charge determining means including means for determining a convergent value of the open circuit voltage using the determined multi-exponential decay function, and for calculating the charge rate using the determined convergent value of the open circuit voltage.

9. (Currently amended) The apparatus of calculating charged rate as claimed in claim 8, wherein the control unit further comprises means for simplifying the multi-exponential decay function ~~the convergent value of the open circuit voltage of the secondary battery is calculated with the function obtained from the quadric or more exponential damping function~~ by removing ~~the~~ a predetermined term in the multi-exponential decay function depending on ~~the~~ a standby time of voltage measurement which is an elapsed time from termination of charge or discharge to starting to measure voltage, and means for applying the measured voltage samples to the simplified exponential decay function to determine its coefficients to determine the simplified

exponential decay function in order that the convergent value of the open circuit voltage of the secondary battery may be calculated from the determined simplified exponential decay function.

10. (Currently amended) The apparatus of calculating charged rate as claimed in claim 8, wherein ~~there are determined the five coefficients of A1, A2, A5, A6 and C of the exponential damping function with time T as described below in~~ the multi-exponential decay function has five coefficients A1, A2, A5, A6 and C and is given by the formula (6)~~, and that the convergent value is calculated with the function~~:

$$F(T) = A1\exp(A5\cdot T) + A2\exp(A6\cdot T) + C \quad (6)$$

wherein T denotes time and F(T) denotes the open circuit voltage.

11. (Currently amended) The apparatus of calculating charged rate as claimed in claim 8, wherein ~~the exponential damping function with time T as described below in~~ the multi-exponential decay function has nine coefficients A1 to A9 and is given by the formula (7) ~~is used~~:

$$F(T) = A1\exp(A5\cdot T) + A2\exp(A6\cdot T) + A3\exp(A7\cdot T) + A4\exp(A8\cdot T) + A9 \quad (7)$$

wherein T denotes time and F(T) denotes the open circuit voltage.

12. (Currently amended) The apparatus of calculating charged rate as claimed in claim 11, wherein the formula (8) mentioned below is used in place of the function F(T) of the formula (7) when the standby time of voltage measurement, which is the time from termination of charge or discharge for the secondary battery to starting the voltage measurement, is more than or equal to ~~the~~ a predetermined first time and less than a predetermined second time, the formula (9) mentioned below is used in place of the function F(T) of the formula (7) when the standby time of voltage measurement is more than or equal to the predetermined second time and less than a predetermined third time, and the formula (10) mentioned below is used in place of the function F(T) of the formula (7) when the standby time of voltage measurement is more than or equal to the predetermined third time:

$$F(T) = A2 \exp(A6 \cdot T) + A3 \exp(A7 \cdot T) + A4 \exp(A8 \cdot T) + A9 \quad (8)$$

$$F(T) = A3 \exp(A7 \cdot T) + A4 \exp(A8 \cdot T) + A9 \quad (9)$$

$$F(T) = A4 \exp(A8 \cdot T) + A9 \quad (10).$$

13. (Original) The apparatus of calculating charged rate as claimed in claim 8, wherein the charged rate is calculated for at least one of two or more batteries.

14. (Original) The apparatus of calculating charged rate as claimed in claim 8, wherein the charged rates of at least two secondary batteries are calculated, and the apparatus comprises a display part which displays the charged rates of the secondary batteries and/or the determination of charge or replacement on each of the secondary batteries, or of ongoing use or not on the same, a storage part which records the histories of the individual batteries, and a control and judgment part with a program to record the histories of the determinations and/or to determine repeatedly.

15. (Currently amended) ~~The~~ A power supply system with secondary battery comprising the apparatus ~~for~~ of calculating charged rate ~~of a secondary battery~~ as claimed in claim 8.

16. (Original) The power supply system for vehicle with secondary battery as claimed in claim 15, wherein the secondary battery is an automotive battery to supply loads on a vehicle with electric power.

17. (Cancelled)